CLAIMS

WE CLAIM:

1. An easy open can end member comprising:

a center panel positioned about a longitudinal axis perpendicular to a diameter of the center panel, the center panel including a closure member for sealing the end member, a portion of the closure member is retainable to a portion of the center panel once the easy open can end member is opened, the center panel having a step portion located radially outwardly from the longitudinal axis, the step portion having an annular convex portion joined to an annular concave portion and displacing at least a portion of the center panel vertically in a direction parallel to the longitudinal axis;

a curl defining an outer perimeter of the end member;

a circumferential chuck wall extending downwardly from the curl; and

a transition wall connecting the chuck wall with a peripheral edge of the center panel, the transition wall comprising a folded portion.

2. The easy open can end member of Claim 1 wherein the step portion displaces the center panel upwardly.

3. The easy open can member of Claim 1 wherein the step portion displaces the center panel downwardly.

4. The easy open can member of Claim 1 wherein the annular concave portion is the radially innermost portion of the step portion.

5. The easy open can member of Claim 1 wherein the annular convex portion is the radially innermost portion of the step portion.

6. The easy open can end member of Claim 1 wherein at least a portion of the annular convex portion is coined.

7. The easy open can end member of Claim 1 wherein at least a portion of the annular concave portion is coined.

8. The easy open can end member of Claim 1 wherein the chuck wall has an arcuate portion.

9. The easy open can end member of Claim 8 wherein the curl has an upper extent located a first distance above the center panel, and the arcuate portion of the chuck wall has a radius of curvature wherein the curl is located at a second distance above an uppermost segment of the arcuate portion and the first distance is expressed using the following relationship:

$$L_{CP} = H_{curl} + R_{CW}(\cos\theta + \sin\psi)$$

wherein L_{CP} is the first distance, H_{curl} is the second distance, R_{CW} is the radius if curvature of the arcuate portion of the chuck wall, the angle ψ is the angle between the arcuate portion of the chuck wall and the vertical line, and the angle θ is an angle measured between a line perpendicular to the longitudinal axis and the uppermost segment of the arcuate portion of the chuck wall.

10. A method of manufacturing an easy open can end member comprising the steps of:

providing a can end shell having a public side and an

opposing product side, the can shell including a center panel disposed about a longitudinal axis, a generally U-shaped countersink, an annular arcuate chuck wall, and a curl defining an outer perimeter of the can end shell, the generally U-shaped countersink joining the chuck wall with the center panel;

providing upper and lower tooling for reforming the can end shell;

supporting the can end shell between the upper and lower tooling;

providing relative movement between the can end shell and the upper and lower tooling to reform the can end shell;

moving the center panel downwardly by said providing relative movement step wherein the U-shaped countersink is removed extending an area of the center panel radially outwardly; and

moving the annular arcuate chuck wall downwardly by said providing relative movement step to form a folded portion between the annular arcuate chuck wall and the center panel.

11. The method of Claim 10 wherein said upper tooling includes first and second forming members, the first forming member positioned radially inwardly from the second forming member, and said providing relative movement step comprises contacting the public side of the center panel with the first forming member and contacting the annular arcuate chuck wall with the second forming member.

12. The method of Claim 11 wherein the lower tooling comprises inner, intermediate, and outer forming members, the inner

forming member located radially inwardly from the intermediate forming segment, and the intermediate forming segment located radially inwardly from the outer forming member, and said providing relative movement step further comprises contacting the product side of the center panel with the inner forming member, contacting the U-shaped countersink with the intermediate forming member, and contacting the product side of the annular arcuate chuck wall with the outer forming.

13. The method of Claim 12 wherein said providing relative movement step further comprises forcing the first forming member downwardly while supporting the U-shaped countersink and the annular arcuate chuck wall.

14. The method of Claim 13 wherein said providing relative movement step further comprises forcing the second and outer forming members downwardly to form the folded portion.

15. The method of Claim 14 wherein said supporting the can end shell between the upper and lower tooling includes supporting a lower portion of the chuck wall against a portion of the outer tooling member.

16. The method of Claim 15 wherein said moving the annular arcuate chuck wall downwardly includes moving the annular arcuate chuck wall radially outwardly by said providing relative movement step.

17. The method of Claim 16 further comprising the step of

reforming the annular arcuate chuck wall wherein the curl has an upper extent located a first distance above the center panel, and the annular arcuate chuck wall has a radius of curvature wherein the curl is located at a second distance above an uppermost segment of the annular arcuate chuck wall and the first distance is expressed using the following relationship:

$$L_{CP} = H_{curl} + R_{CW}(\cos\theta + \sin\psi)$$

wherein L_{CP} is the first distance, H_{curl} is the second distance, R_{CW} is the radius if curvature of the annular arcuate chuck wall, the angle ψ is the angle between the annular arcuate chuck wall and the vertical line, and the angle θ is an angle measured between a line perpendicular to the longitudinal axis and the uppermost segment of the annular arcuate chuck wall.

18. An easy open can end member comprising:

a center panel positioned about a longitudinal axis, the center panel including a closure member for sealing the end member, a portion of the closure member is retainable to a portion of the center panel once the easy open can end member is opened;

a curl defining an outer perimeter of the end member;

a circumferential chuck wall extending downwardly from the curl; and

a transition wall connecting the chuck wall with a peripheral edge of the center panel, the transition wall comprising a folded portion extending radially outwardly relative to the longitudinal axis and radially outwardly of the chuck wall.

19. The easy open can end member of Claim 18 wherein the center panel includes a step portion located radially outwardly from

the longitudinal axis, the step portion having an annular convex portion joined to an annular concave portion and displacing at least a portion of the center panel vertically in a direction parallel to the longitudinal axis.

20. The easy open can end member of Claim 19 wherein the center panel includes plurality of partially circumferential step portions located radially outwardly from the longitudinal axis.